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IS POLICY MIX CONSISTENCY A NECESSARY BUT NOT SUFFICIENT CONDITION FOR TECHNOLOGICAL CHANGE IN RENEWABLE POWER GENERATION TECHNOLOGIES ?

[Special session „How the policy mix is affecting innovation in renewable power generation technologies - new insights from the GRETCHEN project"]

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Overview

The enormous growth of renewable energies has been pushed by diverse policies, which entails benefits in the area of emission, competitiveness, technology advancement, employment in the renewable energy sector, etc. as well as increasing costs for final electricity consumers, such as households and industries or losses of income or jobs in the conventional energy sector. However, policy support is ongoing as technology costs are supposed to decrease further due to innovations and learning effects, which in turn are triggered by increasing use of renewable power generation technologies (RPGT) (Groba and Breitschopf 2013).

This paper analyses the impact of predictable and consistent policies for RPGT in Germany. The policy mix as defined by Rogge and Reichardt (2013) includes not only a mix of instruments but also policy strategy and processes under various dimensions. This paper focuses on the elements of the policy mix, that is the mix of targets and instruments addressing demand for RET, R&D as well as suppliers of RPGT. Predictability is given if policies allow long-term planning or provide planning certainty for investments in RET or related technologies. And consistency of a policy mix reflects policies efficiently supporting the overall objective taking into account potential interactions of instruments etc. The main research question in this paper strives to answer whether predictability and consistency of the policy mix, and the RPGT industry structure have a significant influence on technological change and competitiveness of the PV industry in Germany. The focus of this research scope is depicted in Figure 1.

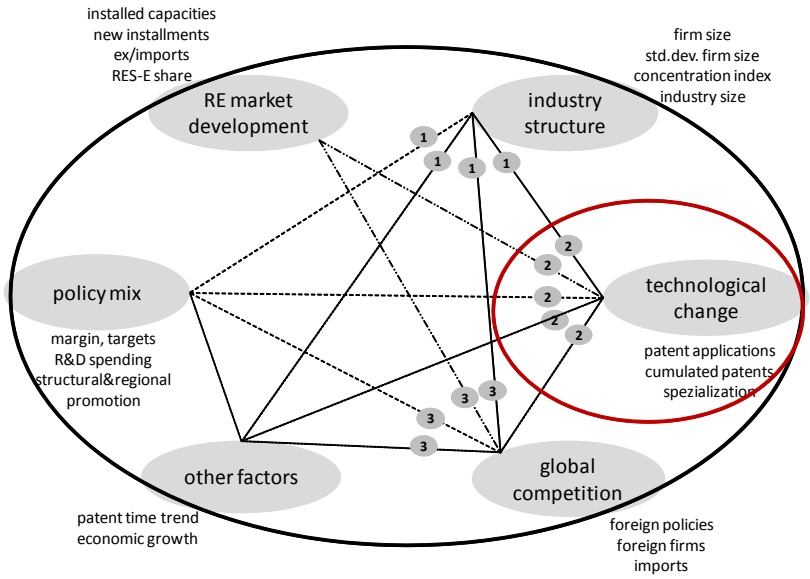

Figure 1: Research scope and focus of the paper

Methods

To answer this research question we look at industry structures and firm sizes as well as at policy targets, policy influenced investor margins, public R&D spending and grants and try to understand whether and how these factors have influenced innovation and technological competitiveness. To measure technological change patent applications are used. It is assumed that a strong specialization in a patent field reflects a strong technological competitiveness in the respective field. As proxies for industry structures and firm size, a concentration ratio (Graf v. Schulenburg, and Wagner 1991) as well as the standard deviation of firm sizes in the PV industry are chosen because they better reflect industry structures than commonly used measures such as number of firms, production, and generation capacities (e.g. Laforet 2008; Grau et al. 2012). A number of variables are utilized to operationalize the policy mix: a special variable has been developed that incorporates the long term horizon of RE deployment, the target itself and the actual RE deployment level. Consistency is reflected by the policy induced investment margin depicting the long term profit of an investment into PV. Public R&D spending and supplier focused policies combine information on short- and medium term policy support as well as on the support level (Masini and Menichetti 2012). First, the paper provides a descriptive analysis, but also conducts a multivariate analysis where firm data as well as global patenting data are used.

Results and conclusions

Consistency is considered to be important as all policies have a positive impact on technological change. However, predictable long-term policies are supposed to be more important as they reflect planning certainty for investors. Preliminary results suggest that industry structures have a moderate influence on patenting activities. While support policies providing a good basis for planning certainty seem to support technological change, short-term support instruments look like they have a lower impact on innovation, but both policies positively contribute to technological change. Furthermore, technological competitiveness of the PV industry in Germany has slightly increased over time and can be explained by the policy mix. Policies with a high long-term predictability show a better correlation with technological advances as short-term policy support. However, besides the German policy mix, foreign policies, global competition and RPGT use contributed to changes in the German PV industry as well. Moreover, technological change occurs not only in the PV industry but also in the upstream industry such as in the automation industry and mechanical engineering.

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